

## **CLAIMS**

1. Method for reducing the content of metals in ionic form present in aqueous effluents, characterised in that it comprises the steps of :

- 5           a) placing the aqueous effluent, comprising at least a metal  $M_i$  in ionic form, in contact with at least a metal  $M_h$  completely or partially coated with hydrogen before and/or during the placing in contact with the metal ion(s)  $M_i$ ; and
- b) recovering the aqueous effluent.

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2. Method according to claim 1, characterised in that the metal  $M_h$  comprises one or more metals selected from the elements of Groups Ib, IIb, IIIb, IVb, Vb, VIb, VIIb and VIII of the Periodic Table of elements.

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3. Method according to either of the preceding claims, characterised in that the metal  $M_h$  comprises one or more metals selected from the elements of Groups Ib, VIIb and VIII of the Periodic Table of elements.

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4. Method according to any one of the preceding claims, characterised in that the metal  $M_h$  comprises one or more metals selected from iron, ruthenium, osmium, cobalt, rhodium, iridium, nickel, palladium and platinum.

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5. Method according to any one of the preceding claims, characterised in that the metal  $M_h$  comprises one or more metals selected from nickel, cobalt, palladium, iridium, ruthenium, rhodium and platinum.

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6. Method according to any one of the preceding claims, characterised in that the metal  $M_h$  comprises nickel.

7. Method according to any one of the preceding claims, characterised in that the metal  $M_h$  is completely or partially coated with hydrogen before being brought into contact with the metal ions  $M_i$  which are present in the aqueous effluent.

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8. Method according to any one of claims 1 to 6, characterised in that the metal  $M_h$  is completely or partially coated with hydrogen during the placing in contact with the metal ions  $M_i$  which are present in the aqueous effluent.

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9. Method according to any one of the preceding claims, characterised in that the metal ions  $M_i$  are the ionic forms of the elements or combinations of elements selected from scandium, yttrium, lanthanum, actinium, titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum, tungsten, manganese, technetium, rhenium, iron, ruthenium, osmium, cobalt, rhodium, iridium, nickel, palladium, platinum, copper, silver, gold, zinc, cadmium, mercury, aluminium, gallium, indium, thallium, silicon, germanium, tin, lead, arsenic, antimony, bismuth, selenium, tellurium, le polonium, iodine, astatine, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium, thorium, protactinium, uranium, neptunium, plutonium, americium, curium, berkelium, californium, einsteinium, fermium, mendelevium, nobelium and lawrencium, alone or in admixture.

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10. Method according to any one of the preceding claims, characterised in that the metal ions  $M_i$  are the ionic forms of the elements or combinations of elements selected from scandium, yttrium, lanthanum, actinium, titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum, tungsten, manganese, technetium, rhenium, iron, ruthenium, osmium, cobalt, rhodium, iridium, nickel, palladium, platinum,

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copper, silver, gold, zinc, cadmium, mercury, aluminium, gallium, indium, thallium, silicon, germanium, tin, lead, arsenic, antimony, bismuth, selenium, tellurium, polonium, iodine, astatine, cerium, europium, uranium, neptunium and plutonium, alone or in admixture.

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11. Method according to any one of the preceding claims, characterised in that the metal ions  $M_i$  are the ionic forms of the elements or combinations of elements selected from titanium, vanadium, chromium, manganese, iron, cobalt, nickel, platinum, copper, silver, gold, zinc,  
10 cadmium, mercury, aluminium, lead, arsenic, antimony, bismuth, selenium, polonium, cerium, uranium, neptunium and plutonium, alone or in admixture.

12. Method according to any one of the preceding claims,  
15 characterised in that the metal ions  $M_i$  are the ionic forms of the elements or combinations of elements selected from tin, chromium, cobalt, nickel, copper, zinc, cadmium, mercury, lead, arsenic, antimony, selenium, polonium, uranium, neptunium and plutonium, alone or in admixture.

20 13. Method according to any one of the preceding claims, characterised in that the metal  $M_h$  is deposited on a support.

14. Method according to any one of the preceding claims, characterised in that it is carried out at temperatures in the order of  
25 between approximately 0°C and 200°C, more particularly between approximately 0°C and approximately 80°C.

15. Method according to any one of the preceding claims, characterised in that it is carried out with aqueous effluents whose pH  
30 value is in the order of between approximately 1 and approximately 14.

16. Method according to any one of the preceding claims, characterised in that the aqueous effluent to be processed is water from groundwater tables, surface water, water distribution networks or industrial water, waster water, slurries and industrial waste.

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17. Decontamination kit comprising at least a metal  $M_h$ , which is intended to be used in the method according to any one of claims 1 to 16.